Viral Hemorrhagic Fevers

Report Immediately

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Viral hemorrhagic fevers (VHFs) include numerous zoonotic diseases, all of which cause a hemorrhagic syndrome in humans. VHFs are known to be caused by filoviruses, arenaviruses, bunyaviruses, and flaviviruses. Some of the specific VHFs include Ebola, Marburg, Lassa, Junin (Argentine VHF), Machupo (Bolivian VHF), Sabia (Brazilian VHF), Guanarito (Venezuelan VHF), Crimean Congo hemorrhagic and Rift Valley fever. Because of its extremely high fatality rate and the importation of the virus into the United States in non-human primates, Ebola hemorrhagic fever has been most publicized in the United States. VHFs have been recognized by the Centers for Disease Control and Prevention (CDC) as being among the top agents of concern for potential bioterrorist weapons.

B. Clinical Description

The onset of viral hemorrhagic fever is usually sudden. The duration of illness can vary from a few days to a couple of weeks. Patients may present with a brief prodrome characterized by nonspecific signs, including fever, headache, malaise, weakness, irritability, dizziness, muscle aches, and nausea and vomiting. As signs progress, they may include low blood pressure, sustained fever, sweats, rash, diarrhea, swelling around the eyes, flushing, and redness of the eyes. As signs become more serious, the patient becomes prostrate and may develop pain in the throat, chest, or abdomen, as well as petechiae and ecchymoses (bruises). Bleeding occurs from mucous membranes (including nosebleeds, and bleeding gums, vomit, urine, stools and sputum), and the patient will often go into shock. Encephalopathy, hepatitis, intention tremors, and reduced white blood cell and platelet levels are frequently seen, and renal failure may occur. Mortality rates for VHFs vary depending on the agent and strain, and can be from 10% to 90%.

C. Reservoirs

Many wild and domestic animals, ticks, and mosquitoes are known to carry some of the VHF agents, although the reservoirs have not been identified for all VHF agents. Rodents are known to be the carriers of Lassa, Junin, Machupo, Guanarito, Crimean Congo hemorrhagic and Rift Valley fever viruses. Mosquitoes, ticks and animals (including rodents, foxes, hares, and groundfeeding birds) are known to carry bunyaviruses that cause VHF. Primates are the only non-human animals known to have been affected by Ebola and Marburg hemorrhagic fever viruses. However, because these infections are associated with a rapid and often fatal illness in these animals, they are not considered reservoirs. Once certain VHF viral infections establish themselves in human populations, rapid person-to-person spread may occur.

D. Modes of Transmission

The mode of transmission for index cases of VHF in any outbreak is animal, tick or mosquito to human. Once a human has acquired infection with a VHF agent, transmission may occur person-to-person. Persons become infected through contact with infectious blood or secretions from infected persons or animals. Individuals have acquired VHFs through sexual contact. Bedding or other fomites may serve as a source of infection. Medical equipment that has not been properly cleaned or sterilized has been responsible for the spread of some VHFs, and rare cases have been acquired by laboratory workers manipulating specimens. For most VHFs, direct

physical contact with infectious blood or secretions is thought to be required for transmission. However, for some VHFs, such as some of the arenaviruses, aerosol spread is considered likely.

E. Incubation Period

The incubation periods for VHFs range from 1 to 21 days, with an average of 3 to 10 days.

F. Period of Communicability or Infectious Period

Infected individuals are generally considered infectious for a variable period preceding the onset of symptoms (up to about 3 weeks for some VHFs) and during the course of clinical symptoms. Virus may remain in the blood and secretions for months after an individual recovers. Contaminated bedding and medical equipment may remain infectious for several days.

G. Epidemiology

Viruses of VHFs are primarily infectious agents in wild animals, birds, mosquitoes and ticks. Individual VHFs occur in different geographic regions. Outbreaks, when they occur, tend to be sporadic. Outbreaks of Ebola virus hemorrhagic fever in imported non-human primates used for research have occurred in the U.S. In one instance, individuals working with infected primates developed antibody to Ebola, suggesting exposure, but the individuals did not become clinically ill. There is speculation that this particular strain of Ebola virus (called Ebola Reston) may be unable to cause clinical disease in humans.

H. Bioterrorist Potential

The viruses that cause VHFs are considered potential bioterrorist agents. If acquired and properly disseminated, these viruses could cause a serious public health challenge in terms of ability to limit the numbers of casualties and control other repercussions from such an attack.

2) REPORTING CRITERIA AND LABORATORY TESTING SERVICES

A. What to Report to the Massachusetts Department of Public Health

- Report any illness suspected by a healthcare provider of being caused by a VHF. Also report any potential exposure to an agent which could cause VHF.

Note: See Section 3) C below for information on how to report a case.

B. Laboratory Testing Services Available

The Massachusetts State Laboratory Institute (SLI) does not provide services for testing clinical specimens for VHFs. However, the Centers for Disease Control and Prevention (CDC) offers testing, and arrangements can be made through the SLI Viral Serology Laboratory at (617) 983-6396. The Viral Serology Laboratory can also give guidance on what specimens to send and how to send them.

3) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify potential sources of transmission which may exist in the United States (such as non-human primates or laboratory specimens).
- To identify sources of transmission and geographical areas of risk outside of the United States.
- To stop transmission from such sources and geographical areas.
- To identify cases as early as possible to prevent transmission to other persons or animals.
- To identify cases and clusters of human illness that may be associated with a bioterrorist event.

B. Laboratory and Healthcare Provider Reporting Requirements

The Massachusetts Department of Public Health (MDPH) requests that healthcare providers **immediately report** to the local board of health in the community where diagnosed any suspect or known case of VHF, or any potential exposure to an agent which could cause VHF. If this is not possible, call the MDPH Division of Epidemiology and Immunization at (617) 983-6800 or (888) 658-2850 (weekdays), or (617) 983-6200 (nights/weekends). Refer to the lists of reportable diseases (at the end of this manual's Introduction) for specific information.

Note: Since the CDC is the principal testing laboratory for VHFs in the United States, any cases in Massachusetts residents would be reported to MDPH by CDC, and MDPH would, in turn, notify the local board of health in the community where the case resides.

C. Local Board of Health Reporting and Follow-Up Responsibilities

1. **Reporting Requirements**

The Massachusetts Department of Public Health (MDPH) requests that information about any suspect or known case of viral hemorrhagic fever, or any potential exposure to an agent which could cause VHF, be **immediately reported** to the MDPH Division of Epidemiology and Immunization by calling (617) 983-6800 or (888) 658-2850 (weekdays), or (617) 983-6200 (nights/weekends). Refer to the *Local Board of Health Reporting Timeline* (at the end of this manual's introductory section) for information on prioritization and timeliness requirements of reporting and case investigation.

2. **Case Investigation**

a. **The most important thing a LBOH can do if it learns of a suspect or confirmed case of VHF, or any potential exposure to an agent which could cause VHF, is to call the MDPH immediately, any time of the day or night.** Daytime phone numbers of the Division of Epidemiology and Immunization are (617) 983-6800 and (888) 658-2850. The emergency phone number for nights and weekends is (617) 983-6200.

b. Case investigation of VHF in Massachusetts residents will be directed by the MDPH Division of Epidemiology and Immunization. If a bioterrorist event is suspected, the MDPH and other response authorities will work closely with LBOHs and provide instructions/information on how to proceed.

c. Following immediate notification of the MDPH, the LBOH(s) may be asked to assist in investigating any case living within their communities, including gathering the following:
   1) The case's name, age, address, phone number, status (hospitalized, at home, deceased), and parent/guardian information, if applicable.
   2) The name and phone number of the hospital where the case is or was hospitalized.
   3) The name and phone number of the case's attending physician.
   4) The name and phone number of the infection control official at the hospital.
   5) If the patient was seen by a healthcare provider before hospitalization, or seen at more than one hospital, be sure to have these names and phone numbers as well.

d. Following immediate notification of the MDPH, the LBOH may be asked to assist in completing an official MDPH *Generic Disease Reporting Form* (in Appendix A). Most of the information required on the form can be obtained from the healthcare provider or the medical record. Use the following guidelines to assist you in completing the form:
   1) Record "Viral Hemorrhagic Fever" as the disease being reported. If possible, record the type of VHF (*e.g.*, Ebola, Marburg, Lassa, Junin, Machupo, Sabia, Guanarito, Crimean Congo hemorrhagic fevers or Rift Valley fever).
   2) Record the case's demographic information.

3) Record the date of symptom onset, symptoms, date of diagnosis, hospitalization information (if applicable), and outcome of disease (*e.g.,* recovered, died).
4) Exposure history: Use the incubation period range for VHF (2–16 days, varying by etiologic agent). Specifically, focus on the period beginning a minimum of 2 days prior to the case's onset date back to no more than 16 days before onset for travel history; determine the date(s) and geographic area(s) traveled to by the case to identify where the patient may have become infected.
5) Complete the import status section to indicate where VHF was acquired. If unsure, check "Unknown."
6) Include any additional comments regarding the case.
7) If you have made several attempts to obtain case information, but have been unsuccessful (*e.g.,* the case or healthcare provider does not return your calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as you have gathered. Please note on the form the reason why it could not be filled out completely.

e. After completing the form, attach lab report(s) and fax or mail (in an envelope marked "Confidential") to the MDPH Division of Epidemiology and Immunization, Surveillance Program. The confidential fax number is (617) 983-6813. Call the Surveillance Program at (617) 983-6801 to confirm receipt of your fax. The mailing address is:

MDPH, Division of Epidemiology and Immunization
Surveillance Program, Room 241
305 South Street
Jamaica Plain, MA 02130

f. Institution of disease control measures is an integral part of case investigation. It is the LBOH responsibility to understand, and, if necessary, institute the control guidelines listed below in Section 4), Controlling Further Spread.

4) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (*105 CMR 300.200*)

Since VHFs are not yet reportable by regulation in Massachusetts, no isolation and quarantine requirements currently exist under *105 CMR 300.200*. However, the following guidelines are recommended.

Minimum Period of Isolation of Patient

Patients should be isolated until they are clinically well, and then monitored. Because blood and secretions may contain virus for up to several months, patients must be educated and monitored for infectiousness. Negative semen or vaginal secretion cultures should be obtained from patients before they resume sexual activity. (Testing is currently done at only a few laboratories that maintain biosafety level 4 facilities [*e.g.,* CDC]).

Minimum Period of Quarantine of Contacts

See Section 4) B, Protection of Contacts of a Case, directly below.

B. Protection of Contacts of a Case

There is no immunization or prophylaxis for contacts of cases. Healthcare workers and other contacts of known or suspected cases of VHF should practice standard (including respiratory) precautions together with contact precautions to reduce their chances of acquiring VHF. Individuals who have had any contact with infectious patients should be monitored by their healthcare provider for the maximum incubation period for the specific agent. Refer to the *Control of Communicable Diseases Manual* (listed in the References sections at the end of this chapter).

C. Managing Special Situations

Reported Incidence Is Higher than Usual/Outbreak Suspected

If an outbreak is suspected, primary investigation will be handled by the Division of Epidemiology and Immunization. A source of infection, such as travel to a geographical region where a known outbreak of VHF is occurring, will be sought and applicable preventive or control measures will be instituted. The Division can determine a course of action to prevent further cases and can perform surveillance for cases across town lines and therefore be difficult to identify at a local level. The local board of health may be asked to assist in the investigation to help determine the source of infection and to implement any necessary control measures.

Note: If a bioterrorist event is suspected, the MDPH and other response authorities will work closely with LBOHs and provide instructions/information on how to proceed.

D. Preventive Measures

Environmental Measures

No environmental measures are necessary; VHFs do not occur naturally in Massachusetts. Note that there has been a rare occurrence in other parts of the US (*i.e.*, California arenavirus).

Personal Preventive Measures/Education

To avoid cases of VHF:

- Avoid traveling to areas with known outbreaks of VHF.
- Laboratory workers handling specimens suspected of containing the agents of VHFs must take appropriate precautions.
- Persons working with imported non-human primates (NHPs) should know the signs of VHF in NHPs; and **immediately report** any cases of suspect or confirmed VHF in NHPs to the MDPH.

For more information regarding international travel and VHFs, contact the CDC's Traveler's Health Office at (877) 394-8747 or through the internet at <http://www.cdc.gov/travel>.

ADDITIONAL INFORMATION

There is no formal CDC case definition for VHFs. (CDC case definitions are used by the state health department and CDC to maintain uniform standards for national reporting.) For reporting a case to the MDPH, always refer to criteria in Section 2) A of this chapter.

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